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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/622,931	11/13/2000	Yoshiki Nakagawa	1581/00210	5489

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EXAMINER

ZALUKAEVA, TATYANA

ART UNIT	PAPER NUMBER
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1713

13

DATE MAILED: 12/10/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

A213

Office Action Summary

Application No.

09/622,931

Applicant(s)

NAKAGAWA ET AL.

Examiner

Tatyana Zalukaeva, PhD

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 November 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 and 8-34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6, 8-34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

The Finality is withdrawn due to the fact that Examiner inadvertently omitted claim 7 in rejections over Kennedy, Randen, Matyjaszewski and Fifield in the First Office Action on the merits, while introducing the rejections of claim 1 (which as amended incorporates limitation of claim 7) over the above references in the Final rejection.

2. Claims 1-6, 8-34 are pending in the Application.

3. Applicants' Amendments have overcome rejections under 35 USC 112, second paragraph and objections to claims, and these rejections and objections are, therefore, withdrawn.

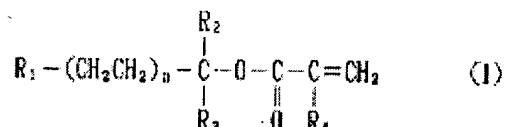
4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. Claims 1-3, 15, 16 and 17 stand rejected under 35 U.S.C. 102(b) as being anticipated by JP 06329720.

JP'720 discloses a new high-purity polyethylene macromonomer obtained by living polymerization, which has a terminal (meth)acryloyl group and can be copolymerized with another vinyl monomer to give a comb-type graft polymer suitable as a polymer blend compatibilizer, a **surface modifier, etc.** In order to obtain such

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polymer ethylene is subjected to living polymerization using a 1-6C linear or branched **alkyllithium/tert diamine initiator**, reacted with a specific carbonyl compound or oxidized with oxygen, and reacted with a **(meth)acrylic acid halide** to give a polyethylene macromonomer of the formula



wherein R1 is a 1-6C linear or branched saturated hydrocarbon group; R2 and R3 are each H or a 1-18C aliphatic or aromatic hydrocarbon group provided R1, R2, and R3 are the same or different from each other; R4 is H or methyl; and n is an integer of 10-1,000). With n (which is a degree of polymerization) ranging from 1-10, 000, the limitation for a molecular weight is inherently met by JP'720.

Thus all the limitations of the instant claims 1-3, 15, 16 and 17 either explicitly or inherently met by the disclosure of JP'720.

6. Claims 1-3, 13, 15-29, 22, 28 and 29 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. 5,242,983 to Kennedy et al.

Kennedy discloses a polymeric composition comprising living polymer of methyl methacrylate copolymerized with **tris(omega.-methacryloyl) polyisobutylene**. A powder is formed from the composition, and the final cement is prepared by mixing the powder with additional methyl methacrylate in the presence of a catalyst to form a

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dough-like material that is polymerized in situ to yield a cement useful for orthopedic purposes (see abstract).

It has been shown by Kennedy that the molecular weight of the methacryloyl telechelic polyisobutylenes should be controlled within particular limits if optimal physical properties between about 6,000 to about 25,000 grams per gram mole (col. 5, lines 20-26)

In addition, it is necessary that the molecular weight distribution of the acryloyl telechelic polyisobutylene, be maintained within a uniform range. M_w/M_n of these compounds does not exceed 1.5, preferably from about 1.2 to about 1.3 (col. 5, lines 28-54).

In preparing a composition of a polymethyl methacrylate with telechelic polyisobutylene Kennedy utilizes N,N-dimethyl p-toluidine as an accelerator, hydroquinone as a stabilizer and benzoyl peroxide as a polymerization catalyst. (col. 7, lines 40-45 and Table 1).

With specific regard to claim 13 Kennedy discloses a methodology of preparation of a telechelic polymer, by first preparing a polyisobutylene, (col. 9, lines 30-47), then functionalizing the said polymer to obtain a hydroxyterminated polyisobutylene, which is in details described in col. 10, lines 25-60, and further reacting such hydroxyterminated polyisobutylene with methacryloyl chloride (col. 10, lines 63-68, col. 11, lines 1-16) to obtain a methacryloyl terminated polyisobutylene.

Thus all the limitations of the above claims are met by the disclosure of Kennedy.

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7. Claims 1-6, 11, 13-20, 22, 23, and 34 stand rejected under 35 U.S.C. 102(b) as being anticipated by Randen et al (U.S. 5,604,268) .

Randen discloses an adhesive composition comprising functionally reactive macromers, which are prepared from the corresponding telechelic prepolymers of, for example, octadecyl acrylate (ODA), behenyl acrylate (BeA) and mixtures of tetradecyl acrylate (TDA), and a variety of other acrylates and acrylic esters, all prepared by living polymerization. (col. 5, lines 46-55).

Macromers with calculated molecular weights of 2500, 5000, 11,000 and 20,000 g/mole for ODA and macromers of BeA with calculated molecular weights of 4500 and 11,000 have been prepared (col. 5, lines 58-65). The hydroxyterminated telechelic polymers were then functionalized with acryloyl chloride(ACI), methacryloyl chloride(MACI), 2'-isocyanatoethyl methacrylate(IEM), 3-isopropenyl-alpha, alpha-dimethylbenzyl isocyanate(IPDMBI) and the like. (col. 13, lines 1-14)

Example 23a in Table 3 demonstrated the preparation of an ODA hydroxy-terminated, telechelic prepolymer with a calculated molecular weight of approximately 11,000, wherein mercaptoethanol (col. 13, line 21) is used as a chain transfer agent.

Other ODA hydroxy-terminated telechelic prepolymers with calculated molecular weights of approximately 2500, 5000, 7500 and 20,000 g/mole were prepared in the same manner and are shown in Table 3, Examples 20, 21, 22 and 28 respectively. Examples 23c through 27 demonstrated telechelic polymers with varying amounts of ODA homopolymer therein.

8. Claims 8- 12 stand rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over any one of the following: JP'720, Kennedy or Randen, each one individually.

Claims 8-12 are product-by-process claims. Each one of the cited references discloses an acryloyl group end-functional or telechelic vinyl polymers, and provide different chemical reactions describing functionalization of polymers in order to achieve the desired end-functionality. With regard to claim 12 there is no evidence, or no reason to believe that the process of functionalization as instantly claimed in claim 12 produces a different product, that of reaction of JP'720, Kennedy and Randen, consult **In re Thorpe**, 227 USPQ 964 (CAFC 1985).

Furthermore, because of the nature of product-by process claims, the Examiner cannot ordinary focus on the precise difference between the claimed product and the disclosed product. It is then Applicants' burden to prove that an unobvious difference exists. See **In re Marosi**, 218 USPQ 289, 292-293 (CAFC 1983).

In the instant case no Graham vs. John Deere analysis was made but rather the test set out in MPEP 706.03(e) and In re Marosi was applied while explaining why the claimed product does not patentably distinguish over the prior art under 35 USC 102/103.

See also footnote 11 O.G. Notice 1162 59-61, wherein a 35 USC 102/103 rejection is authorized in the case of product-by-process claims because the exact

identity of the claimed product or the prior art product cannot be determined by the Examiner.

9. Claims 6, 8-10, 21, 30-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matyaszeewski (U.S. 5,807,937) alone or over JP'720 in combination with Matyaszeewski.

JP'720 discloses JP'720 discloses a new high-purity polyethylene macromonomer which has a terminal (meth)acryloyl group prepared by living anionic polymerization.

However, JP'720 does not elucidate the specific type of living polymerization, namely atom transfer radical polymerization with the use of specific transitional metal complexes, nor does it specify the aqueous emulsion as a composition containing such polymers.

Matyaszeewski discloses a method of atom transfer radical polymerization (ATRP), as a kind of a living polymerization process in particular application to the process of making end functional and telechelic polymers (see abstract, figure 1, col.25, lines 31-35, col. 26, lines 5-56, etc.) Matyaszeewski discloses a variety of suitable polymers, including acrylates, methacrylates, styrene and other vinyl polymers, terminated by a variety of functional groups, including acryloyl groups, as can be derived from the meaning of X explained through the whole body of a patent). The range of molecular weights and molecular weight distributions of Matyaszeewski's end-functional and telechelic polymers are within the instantly claimed range (see, for example col. 26,

lines 44-56)..Metal complex catalyst utilized by Matyaszewski is preferably a copper complex. The end functionality of the copolymers of Matyaszewski can be easily converted to other functional groups, including acryloyl groups by any conventional and known methods (col. 39, lines 15-25). Polymers can be prepared using water as a medium, utilizing an emulsion polymerization (col. 39, lines 43, 44).

Since both Matyaszewski and JP'720 teach the living radical polymerization of vinyl compounds terminated by acryloyl groups, and since Matyaszewski provides detailed description and mechanism of ATRP, one skilled in the art would have found it obvious to utilize the specificities of Matyaszewski in a living process of JP'720 in order to achieve the advantages of ATRP, such as controllable molecular weight and narrow molecular weight distribution.

10. Claims 19, 24-32 stand rejected under 35 U.S.C. 103(a) as being unpatentable over any one of JP'720, Kennedy, Randen or Matyaszewski (each one individually) in view of Fifield (U.S. 5,381,735).

JP '720, Kennedy, Randen and Matyaszewski all disclose acryloyl group end functional vinyl polymers, which are components for curable compositions. However, the above references do not specify photocuring by means of actinic rays or photopolymerization initiators.

Actinic radiation and photoinitiators are well known to those skilled in the art for curing polymeric compositions.

Thus Fifield discloses photopolymerizable composition comprises a photopolymerizable material having ethylenically unsaturated bonds available for participation in addition (free radical) polymerization. Prepolymers, of Fifield are those having olefinic bonds at the termini of the chain are subsequently further polymerized by use of **actinic radiation**. (col.4, lines 24-35)

The termini of the prepolymer chain are typically "capped" via an ester or carbamoyl (urethane) linkage with an olefinic moiety such as an acrylate or methacrylate. (col. 4, lines 43-46). The composition can be also thermally cured with the use of thermal initiators (col. 7, lines 45-50).

Since JP'720, Kennedy, Randen or Matyaszezewski suggest curing or crosslinking a composition comprising a polymer having terminal functional group, and Fifield specifies the details of curing process for the similar compositions one skilled in the art would have reasonably expect that the conventionally known techniques of photopolymerization are operable within the scope of JP'720, Kennedy, Randen or Matyaszezewski inventions with the reasonable expectation of success.

Therefore, the combination of references renders the above claims prima facie obvious and properly rejected under 35 USC 103(a).

Response to Arguments

1. Applicant's arguments filed July 29, 2002 have been fully considered but they are not persuasive. Applicants only presented arguments for the rejection based on JP'720 reference. These arguments are addressed below.

The **crux** of Applicants' arguments with regard to JP'720 rejection appears to hinge on Applicants' interpretation of the clause from the instant claim 1 "at least one terminal group of the general formula 1 per molecule" Applicants further refer to page 6, lines 27-29 of their specification, which states "the number of the group of the general formula (1)...is preferably 1.2 to 4". Applicants further state that the applied reference has only one terminal group per molecule.

In response to this, Examiner would like to address several issues:

- Applicants are cordially invited to the same page 6, line 26 of their specification, which expressly states "the number of groups of the formula (1) is not less than 1...". This means that 1 (ONE) is also included in the scope.
- The language of the instant claim 1 **"at least one terminal group" means one and more, but "one" is constructively present. *In re Lamberti*, 545 F.2d 747, 750, 192 USPQ 278, 280 (CCPA 1976).**
- Even if *arguendo* the instant specification provides for possibility of having more than 1 terminal group, the instant claim 1(supported by the spec) calls explicitly for at least one group. Therefore, Applicants arguments are more specific than

the claims. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Applicants further argue that polymers prepared according to JP'720 do not have even one terminal methacryloyl group per molecule. Applicants refer to specific examples of JP'720 showing 87% of terminal methacryloyl introduction.

In response to this, Applicants' attention is drawn to a translation of JP'720 presented by the Examiner along with the previous Office Action.

Claim 1 on page 1 of the translation and formula (1) on page 1 states that polymer has "... acryloyl or methacryloyl group at the terminal". And formula (1) shows 1 (one) (meth)acryloyl terminal group per molecule. Furthermore, JP'720 points in [0032] that for reaction to produce terminal (meth)acryloyl groups there is no limit in the amount of acrylic acid halide, however Examples use 1-1.2 equivalents. Therefore using greater excess of acrylic acid halide will inherently produce higher "introduction" of acryloyl groups. Applicants further reminded that disclosed examples and preferred embodiments do not constitute a teaching away from a **broader disclosure or nonpreferred embodiments**. *In re Susi*, 440 F.2d 442, 169 USPQ 423 (CCPA 1971). A reference may be relied upon for all that it would have reasonably suggested to one having ordinary skill the art, including nonpreferred embodiments. *Merck & Co. v. Biocraft Laboratories*, 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied, 493

U.S. 975 (1989). See also *Celeritas Technologies Ltd. v. Rockwell International Corp.*, 150 F.3d 1354, 1361, 47 USPQ2d 1516, 1522-23 (Fed. Cir.1998).

In response to Applicants' statement that JP'720 fails to anticipate the instant claims and citation of case laws that each and every recitation as set forth in the claims should be disclosed by the reference, it is noted that JP'720 does anticipate each and every limitation of the instant claims. A reference anticipates a claim, if it discloses the claimed invention such that a skilled artisan could take this teaching in combination with his own knowledge of the particular art and be in possession of the invention, as per *In re Graves*, 36 USPQ 2d 1697 (Fed. Cir. 1995), or *In re Sasse*, 207 USPQ 107 (CCPA 1980).

And furthermore, the disclosure in a reference must show the claimed elements arranged as in the claim, but need not be in identical words as used in the claim to be anticipatory. *In re Bond*, 15 USPQ 2d 1566 (Fed. Cir. 1990).

2. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tatyana Zalukaeva, PhD whose telephone number is (703)308-8819. The examiner can normally be reached on 9:00 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu can be reached on (703) 308-2450. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0651.



December 5, 2002

Tatyana Zalukaeva, PhD
Primary Examiner
Art Unit 1713